FIG. 1

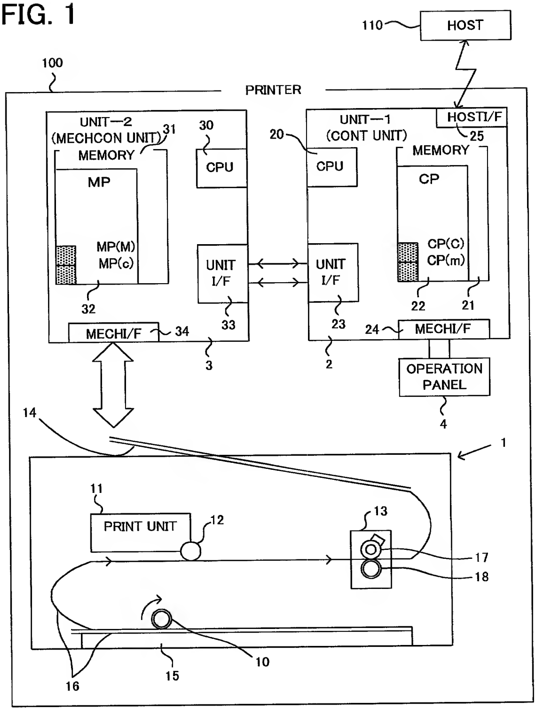

110
HOST
100
PRINTER
UNIT—2
(MECHCON UNIT)
31
30
MEMORY
CPU
MP
MP(M)
MP(c)
32
MECHI/F
34
33
UNIT
I/F
3
20
UNIT—1
(CONT UNIT)
HOSTI/F
25
CPU
MEMORY
CP
CP(C)
CP(m)
UNIT
I/F
22
21
23
24
MECHI/F
2
OPERATION
PANEL
4
14
1
11
PRINT UNIT
12
13
17
18
10
15
16

FIG. 2

CP(C)=VERSION DATA OF CP ITSELF

CP(m)=MP SUPPORT VERSION DATA
(NEWEST VERSION DATA OF MP TO BE SUPPORTED BY CP)

MP(M)=VERSION DATA OF MP ITSELF

MP(c)=CP SUPPORT VERSION DATA
(NEWEST VERSION DATA OF CP TO BE SUPPORTED BY MP)

FIG. 3

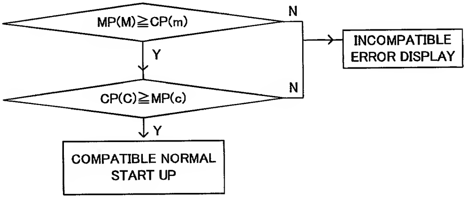


FIG. 4

[HISTORIC VERSION OF PRINTER]

VERSION	UNIT／CONTROL PROGRAM VERSION
1ST VERSION	MECHCON UNIT: MP(M)=V01L01 MP(c)=MORE V01L01 CONT UNIT :CP(C)=V01L01 CP(m)=MORE V01L01
2ND VERSION	SUBSTITUTE MECHCON DUE TO FAILURE
	MECHCON UNIT: MP(M)=V02L01 MP(c)=MORE V01L01 CONT UNIT :CP(C)=V01L01 CP(m)=MORE V01L01
3RD VERSION	SUBSTITUE MECHCON AND CONT DUE TO FUNCTION ENHANCE
	MECHCON UNIT: MP(M)=V03L01 MP(c)=MORE V02L01 CONT UNIT :CP(C)=V02L01 CP(m)=MORE V03L01

CASE1 :IN 2ND VERSION PRINTER, MECHCON UNIT IS SUBSTITUTED TO MP(M)=V01L01
CP(C)≧MP(c)IS
0101 ≧0101, OK

MP(M)≧CP(m)IS
0201 ≧0101,OK AND NORMAL START UP

CASE2 :IN 3RD VERSION PRINTER, MECHCON UNIT IS SUBSTITUTED TO MP(M)=V02L01
CP(C)≧MP(c)IS
0201 ≧0101, OK

MP(M)≧CP(m)IS
0201 ≧0301, AND ERROR INDICATION

FIG. 5

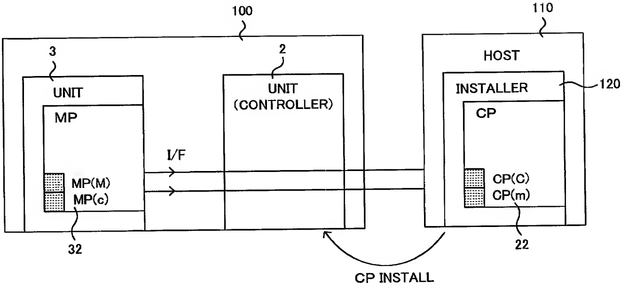


FIG. 6

MU(M) = VVLL (VERSION DATA OF MU)

MU(c) = CU SUPPORT VERSION DATA

CU(m) = MU SUPPORT VERSION DATA

CU(c) = CU VERSION DATA
(= vvll)

FIG. 7A

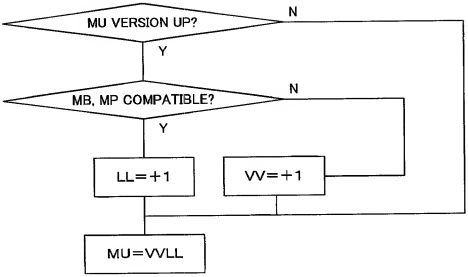

MU VERSION UP?
N
Y
MB, MP COMPATIBLE?
N
Y
LL=+1
VV=+1
MU=VVLL

FIG. 7B

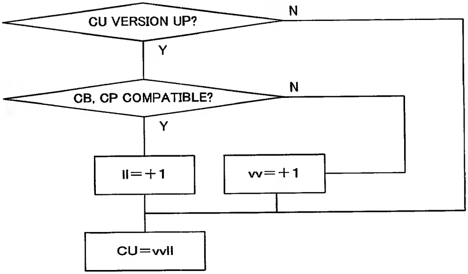

CU VERSION UP?
N
Y
CB, CP COMPATIBLE?
N
Y
ll=+1
vv=+1
CU=vvll

FIG. 8

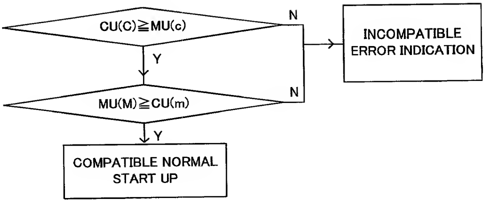

CU(C)≧MU(c)
N
Y
MU(M)≧CU(m)
N
Y
INCOMPATIBLE ERROR INDICATION
COMPATIBLE NORMAL START UP

FIG. 9

[HISTORIC VERSION OF PRINTER]

VERSION	UNIT／CONTROL PROGRAM VERSION
1ST VERSION	MECHCON UNIT:MU(M)=V01L01 MU(c)=MORE V01L01 CONT UNIT :CU(C)=V01L01 CU(m)=MORE V01L01
2ND VERSION	MECHCON BOARD AND CONTROL PROGRAM ARE SUBSTITUTED DUE TO MECH BOARD FAILURE
	MECHCON UNIT:MU(M)=V01L02 MU(c)=MORE V01L01 CONT UNIT :CU(C)=V01L01 CU(m)=MORE V01L01
3RD VERSION	MECHCON BOARD AND CONTROLLER BOARD ARE SUBSTITUTED DUE TO FUNCTION ENHANCE
	MECHCON UNIT:MU(M)=V02L01(V UP) MU(c)=MORE V02L01 CONT UNIT :CU(C)=V02L01(V UP) CU(m)=MORE V02L01

CASE1:IN 2ND VERSION PRINTER, MECHCON UNIT IS SUBSTITUTED TO MU(M)=V01L01
CU(C)≧MU(c) IS
0101 ≧0101, OK

MU(M)≧CU(m) IS
0101 ≧0101, OK AND NORMAL START UP

CASE2:IN 3RD VERSION PRINTER, MECHCON UNIT IS SUBSTITUTED TO MU(M)=V01L02
CU(C)≧MU(c) IS
0201 ≧0201, OK

MU(M)≧CU(m)IS
0102 ≧0201, NG AND ERROR INDICATION

CASE3:IN 2ND VERSION PRINTER, CONTROLLER UNIT IS SUBSTITUTED TO CU(C)=V02L01
CU(C)≧MU(c) IS
0201 ≧0101, OK

MU(M)≧CU(m) IS
0102 ≧0201, NG AND ERROR INDICATION

FIG. 10

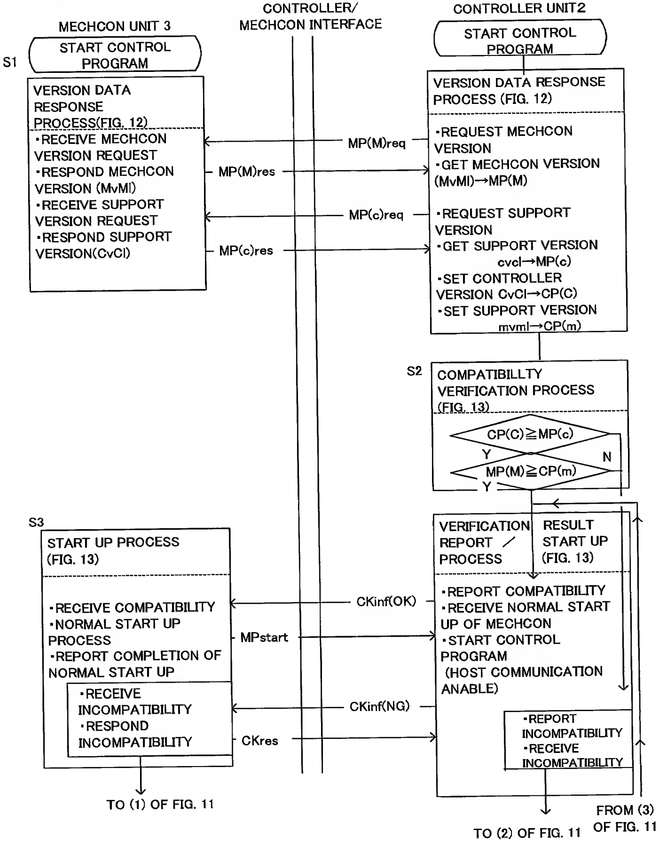
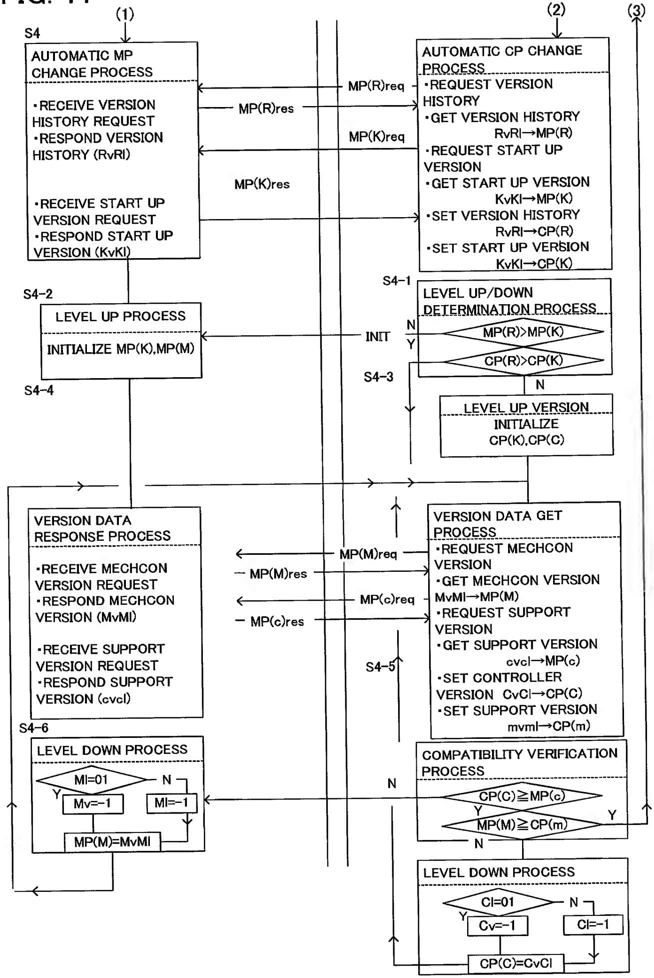

MECHCON UNIT 3
CONTROLLER/ MECHCON INTERFACE
CONTROLLER UNIT2
S1
START CONTROL PROGRAM
VERSION DATA RESPONSE PROCESS(FIG. 12)
・RECEIVE MECHCON VERSION REQUEST
・RESPOND MECHCON VERSION (MvMI)
・RECEIVE SUPPORT VERSION REQUEST
・RESPOND SUPPORT VERSION(CvCI)
START CONTROL PROGRAM
VERSION DATA RESPONSE PROCESS (FIG. 12)
・REQUEST MECHCON VERSION
・GET MECHCON VERSION (MvMI)→MP(M)
・REQUEST SUPPORT VERSION
・GET SUPPORT VERSION cvcl→MP(c)
・SET CONTROLLER VERSION CvCI→CP(C)
・SET SUPPORT VERSION mvml→CP(m)
MP(M)req
MP(M)res
MP(c)req
MP(c)res
S2
COMPATIBILLTY VERIFICATION PROCESS (FIG. 13)
CP(C)≧MP(c)
Y
N
MP(M)≧CP(m)
Y
S3
START UP PROCESS (FIG. 13)
・RECEIVE COMPATIBILITY
・NORMAL START UP PROCESS
・REPORT COMPLETION OF NORMAL START UP
・RECEIVE INCOMPATIBILITY
・RESPOND INCOMPATIBILITY
VERIFICATION RESULT REPORT / START UP PROCESS (FIG. 13)
・REPORT COMPATIBILITY
・RECEIVE NORMAL START UP OF MECHCON
・START CONTROL PROGRAM (HOST COMMUNICATION ANABLE)
・REPORT INCOMPATIBILITY
・RECEIVE INCOMPATIBILITY
CKinf(OK)
MPstart
CKinf(NG)
CKres
TO (1) OF FIG. 11
TO (2) OF FIG. 11
FROM (3) OF FIG. 11

FIG. 11



(1)
(2)
(3)
S4
AUTOMATIC MP CHANGE PROCESS
・RECEIVE VERSION HISTORY REQUEST
・RESPOND VERSION HISTORY (RvRI)
・RECEIVE START UP VERSION REQUEST
・RESPOND START UP VERSION (KvKI)
MP(R)req
MP(R)res
MP(K)req
MP(K)res
AUTOMATIC CP CHANGE PROCESS
・REQUEST VERSION HISTORY
・GET VERSION HISTORY RvRI→MP(R)
・REQUEST START UP VERSION
・GET START UP VERSION KvKI→MP(K)
・SET VERSION HISTORY RvRI→CP(R)
・SET START UP VERSION KvKI→CP(K)
S4-1
LEVEL UP/DOWN DETERMINATION PROCESS
N
MP(R)>MP(K)
Y
CP(R)>CP(K)
N
S4-2
LEVEL UP PROCESS
INITIALIZE MP(K),MP(M)
INIT
S4-3
LEVEL UP VERSION
INITIALIZE CP(K),CP(C)
S4-4
VERSION DATA RESPONSE PROCESS
・RECEIVE MECHCON VERSION REQUEST
・RESPOND MECHCON VERSION (MvMI)
・RECEIVE SUPPORT VERSION REQUEST
・RESPOND SUPPORT VERSION (cvcl)
MP(M)req
MP(M)res
MP(c)req
MP(c)res
VERSION DATA GET PROCESS
・REQUEST MECHCON VERSION
・GET MECHCON VERSION MvMI→MP(M)
・REQUEST SUPPORT VERSION
・GET SUPPORT VERSION cvcl→MP(c)
・SET CONTROLLER VERSION CvCI→CP(C)
・SET SUPPORT VERSION mvml→CP(m)
S4-5
S4-6
LEVEL DOWN PROCESS
MI=01
N
Y
Mv=-1
MI=-1
MP(M)=MvMI
COMPATIBILITY VERIFICATION PROCESS
N
CP(C)≧MP(c)
Y
MP(M)≧CP(m)
Y
N
LEVEL DOWN PROCESS
CI=01
N
Y
Cv=-1
CI=-1
CP(C)=CvCI

FIG. 12

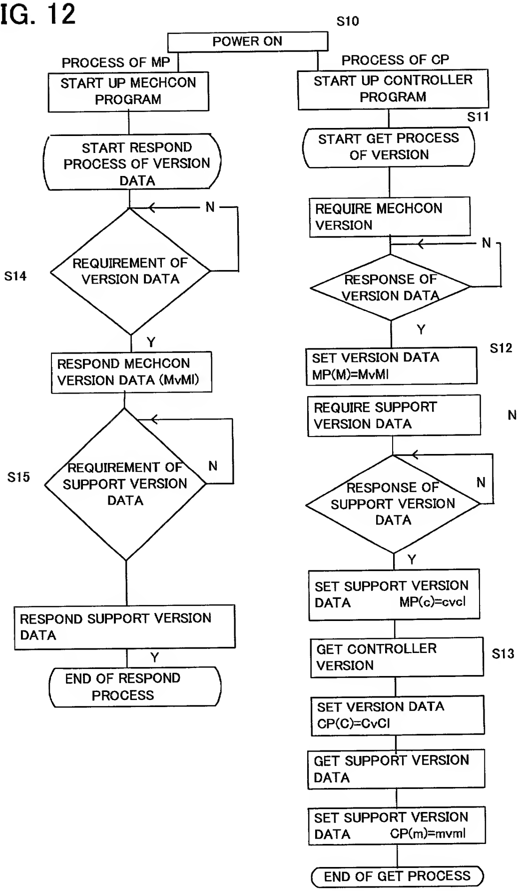

S10
POWER ON
PROCESS OF MP
PROCESS OF CP
START UP MECHCON PROGRAM
START UP CONTROLLER PROGRAM
S11
START RESPOND PROCESS OF VERSION DATA
START GET PROCESS OF VERSION
N
REQUIRE MECHCON VERSION
N
S14
REQUIREMENT OF VERSION DATA
RESPONSE OF VERSION DATA
Y
Y
RESPOND MECHCON VERSION DATA (MvMI)
SET VERSION DATA MP(M)=MvMI
S12
REQUIRE SUPPORT VERSION DATA
N
N
S15
REQUIREMENT OF SUPPORT VERSION DATA
RESPONSE OF SUPPORT VERSION DATA
N
Y
SET SUPPORT VERSION DATA MP(c)=cvcl
RESPOND SUPPORT VERSION DATA
GET CONTROLLER VERSION
S13
Y
END OF RESPOND PROCESS
SET VERSION DATA CP(C)=CvCI
GET SUPPORT VERSION DATA
SET SUPPORT VERSION DATA CP(m)=mvml
END OF GET PROCESS

FIG. 13

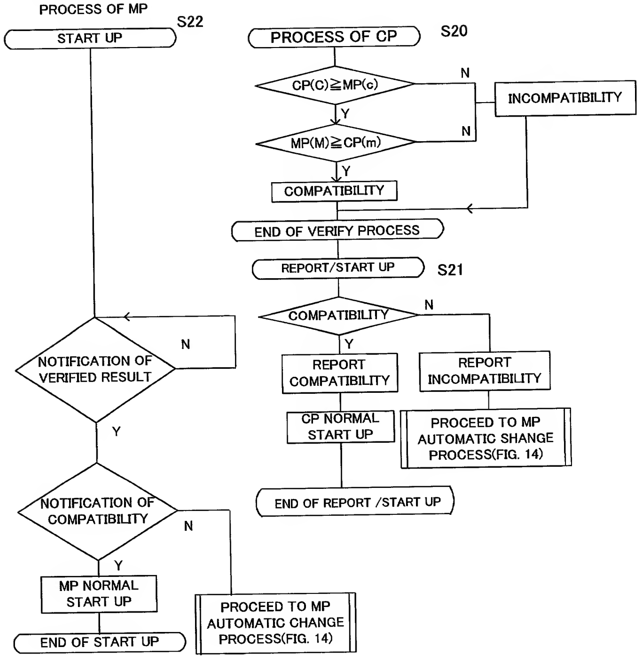
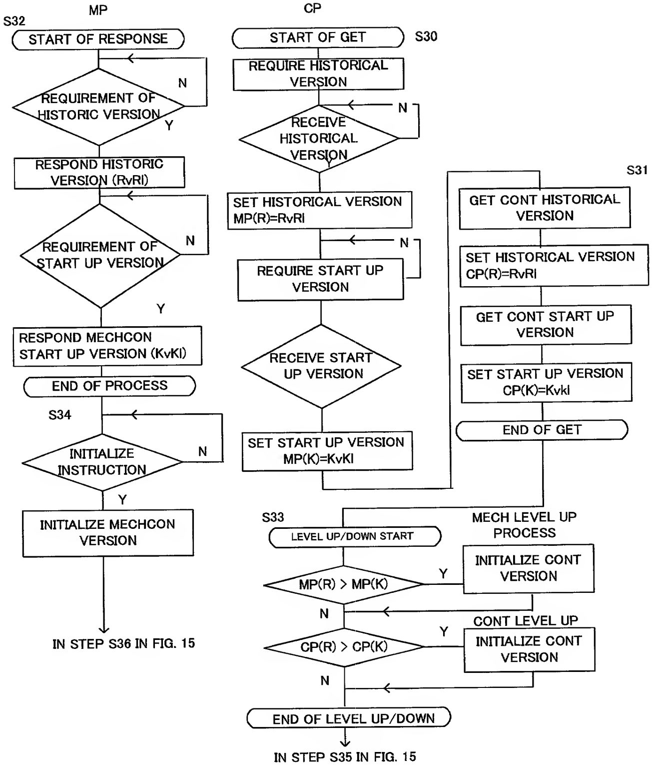
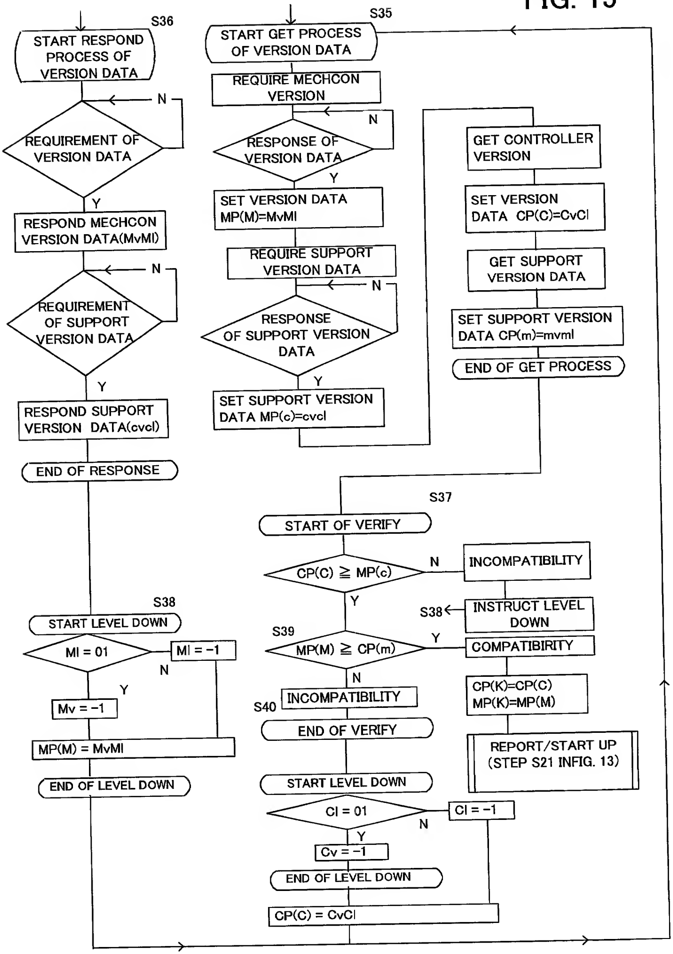

PROCESS OF MP
S22
START UP
PROCESS OF CP
S20
CP(C)≧MP(c)
N
Y
INCOMPATIBILITY
MP(M)≧CP(m)
N
Y
COMPATIBILITY
END OF VERIFY PROCESS
REPORT/START UP
S21
COMPATIBILITY
N
Y
REPORT COMPATIBILITY
REPORT INCOMPATIBILITY
CP NORMAL START UP
PROCEED TO MP AUTOMATIC SHANGE PROCESS(FIG. 14)
END OF REPORT /START UP
NOTIFICATION OF VERIFIED RESULT
N
Y
NOTIFICATION OF COMPATIBILITY
N
Y
MP NORMAL START UP
END OF START UP
PROCEED TO MP AUTOMATIC CHANGE PROCESS(FIG. 14)

FIG. 14



MP
S32
START OF RESPONSE
REQUIREMENT OF HISTORIC VERSION
N
Y
RESPOND HISTORIC VERSION (RvRI)
REQUIREMENT OF START UP VERSION
N
Y
RESPOND MECHCON START UP VERSION (KvKI)
END OF PROCESS
S34
INITIALIZE INSTRUCTION
N
Y
INITIALIZE MECHCON VERSION
IN STEP S36 IN FIG. 15
CP
START OF GET
S30
REQUIRE HISTORICAL VERSION
N
RECEIVE HISTORICAL VERSION
Y
SET HISTORICAL VERSION MP(R)=RvRI
N
REQUIRE START UP VERSION
RECEIVE START UP VERSION
SET START UP VERSION MP(K)=KvKI
S31
GET CONT HISTORICAL VERSION
SET HISTORICAL VERSION CP(R)=RvRI
GET CONT START UP VERSION
SET START UP VERSION CP(K)=KvkI
END OF GET
S33
LEVEL UP/DOWN START
MECH LEVEL UP PROCESS
MP(R) > MP(K)
Y
INITIALIZE CONT VERSION
N
CONT LEVEL UP
CP(R) > CP(K)
Y
INITIALIZE CONT VERSION
N
END OF LEVEL UP/DOWN
IN STEP S35 IN FIG. 15

FIG. 15



S36
START RESPOND PROCESS OF VERSION DATA
REQUIREMENT OF VERSION DATA
N
Y
RESPOND MECHCON VERSION DATA(MvMl)
REQUIREMENT OF SUPPORT VERSION DATA
N
Y
RESPOND SUPPORT VERSION DATA(cvcl)
END OF RESPONSE
S35
START GET PROCESS OF VERSION DATA
REQUIRE MECHCON VERSION
RESPONSE OF VERSION DATA
N
Y
SET VERSION DATA MP(M)=MvMl
REQUIRE SUPPORT VERSION DATA
RESPONSE OF SUPPORT VERSION DATA
N
Y
SET SUPPORT VERSION DATA MP(c)=cvcl
GET CONTROLLER VERSION
SET VERSION DATA CP(C)=CvCl
GET SUPPORT VERSION DATA
SET SUPPORT VERSION DATA CP(m)=mvml
END OF GET PROCESS
S37
START OF VERIFY
CP(C) ≧ MP(c)
N
INCOMPATIBILITY
Y
S38
INSTRUCT LEVEL DOWN
S39
MP(M) ≧ CP(m)
Y
COMPATIBIRITY
N
INCOMPATIBILITY
S40
END OF VERIFY
CP(K)=CP(C)
MP(K)=MP(M)
REPORT/START UP (STEP S21 INFIG. 13)
START LEVEL DOWN
Cl = 01
N
Cl = −1
Y
Cv = −1
END OF LEVEL DOWN
CP(C) = CvCl
S38
START LEVEL DOWN
Ml = 01
Ml = −1
N
Y
Mv = −1
MP(M) = MvMl
END OF LEVEL DOWN

FIG. 16

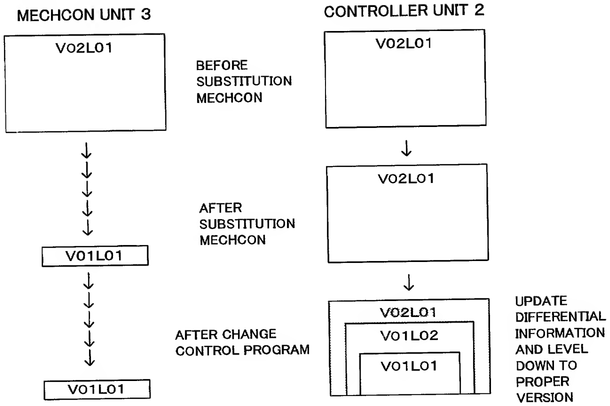


FIG. 17

INITIAL VALUE AFTER MECHCON UNIT SUBSTITUTION
  CONTROL PROGRAM VERSION: MP(M)=V01L01、MP(c)=V01L01
  VERSION HISTRY : MP(R)=V01L01
  START UP VERSION : MP(K)=V01L01
INITIAL VALUE OF CONTROLLER UNIT
  CONTROL PROGRAM VERSION: CP(C)=V02L01、CP(m)=V02L01
  VERSION HISTRY : CP(R)=V02L01/V01L02/V01L01
  START UP VERSION : CP(K)=V02L01
VALUE OF CONTROLLER UNIT AFTER MECHCON UNIT SUBSTITUTION
  CONTROL PROGRAM VERSION: CP(C)=V01L02、CP(m)=V01L02
  VERSION HISTRY : CP(R)=V02L01/V01L02/V01L01
  START UP VERSION : CP(K)=V01L02

FIG. 18

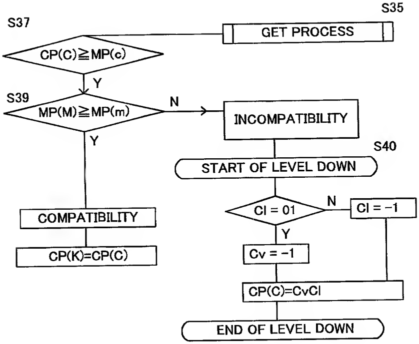

S35
GET PROCESS
S37
CP(C)≧MP(c)
Y
S39
MP(M)≧MP(m)
N
INCOMPATIBILITY
Y
S40
START OF LEVEL DOWN
COMPATIBILITY
CI = 01
N
CI = −1
Y
CP(K)=CP(C)
Cv = −1
CP(C)=CvCI
END OF LEVEL DOWN

FIG. 19

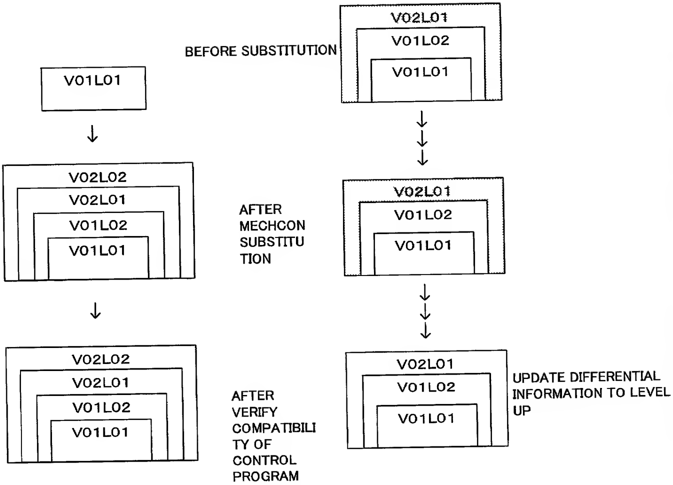
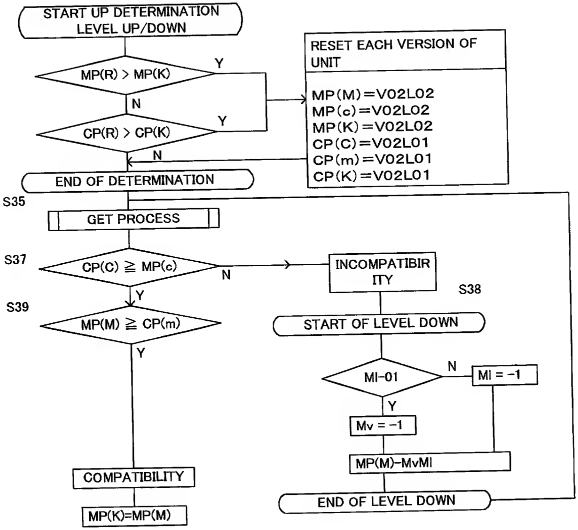

BEFORE SUBSTITUTION
V02L01
V01L02
V01L01
V01L01
V02L02
V02L01
V01L02
V01L01
AFTER MECHCON SUBSTITUTION
V02L01
V01L02
V01L01
V02L02
V02L01
V01L02
V01L01
AFTER VERIFY COMPATIBILITY OF CONTROL PROGRAM
V02L01
V01L02
V01L01
UPDATE DIFFERENTIAL INFORMATION TO LEVEL UP

FIG. 20


START UP DETERMINATION LEVEL UP/DOWN
MP(R) > MP(K)
Y
N
CP(R) > CP(K)
Y
N
RESET EACH VERSION OF UNIT
MP(M)=V02L02
MP(c)=V02L02
MP(K)=V02L02
CP(C)=V02L01
CP(m)=V02L01
CP(K)=V02L01
END OF DETERMINATION
S35
GET PROCESS
S37
CP(C) ≧ MP(c)
N
INCOMPATIBIRITY
S38
Y
S39
MP(M) ≧ CP(m)
START OF LEVEL DOWN
Y
MI-01
N
MI = -1
Y
Mv = -1
MP(M)-MvMI
COMPATIBILITY
MP(K)=MP(M)
END OF LEVEL DOWN